1. Use the product rule to multiply: $\sqrt{3x} \cdot \sqrt{2}$ $\qquad \sqrt{6x}$

2. Use the quotient rule to simplify: $\sqrt{\dfrac{21}{100}}$ $\qquad \dfrac{\sqrt{21}}{10}$

3. Use the quotient rule to simplify: $\sqrt[2]{\dfrac{2x^{2}}{49y^{8}}}$ $\qquad \dfrac{\sqrt{2}\,x^{1}}{7y^{4}}$

4. Use the quotient rule to divide. Then simplify if possible: $\dfrac{\boxed{3}\sqrt[3]{250a^7}}{\sqrt[3]{2a}}$

$$\sqrt[3]{125a^6}$$

$$3 \times 5a^2$$

$$15a^2 \checkmark$$

5. Subtract the following radicals: $10\sqrt{75}-2\sqrt{28}-2\sqrt{27}$

$\sqrt{25}\sqrt{3}$ $\sqrt{4}\sqrt{7}$ $\sqrt{9}\sqrt{3}$

5 2 3

$50\sqrt{3}-4\sqrt{7}-6\sqrt{3}$

$44\sqrt{3}-4\sqrt{7}$ ✓

6. Multiply. Assume that all variables represent positive real numbers: $(7\sqrt{x}-7)(6\sqrt{x}-4)$

$42\boxed{\sqrt{x^2}} - 28\sqrt{x} - 42\sqrt{x} + 28$

✓ $42x - 70\sqrt{x} + 28$

7. Rationalize the denominator and simplify: $\frac{2\sqrt{3}}{\sqrt{7}} \cdot \frac{\sqrt{7}}{\sqrt{7}} = \frac{2\sqrt{21}}{\sqrt{49}} = \frac{2\sqrt{21}}{7}$

✓

8. Rationalize the denominator and simplify: $\frac{2}{5-\sqrt{10}}$

$\frac{5+\sqrt{10}}{5+\sqrt{10}}$

Top

$2(5+\sqrt{10})$

$\boxed{10+2\sqrt{10}}$

Bottom

$(5-\sqrt{10})(5+\sqrt{10})$

$25+\cancel{5\sqrt{10}}-\cancel{5\sqrt{10}}-\sqrt{100}$

$25-10$

$\boxed{15}$

$\boxed{\frac{10+2\sqrt{10}}{15}}$

9. Solve the radical equation: $\sqrt{4x-3}^2 = 5^2$

$4x - 3 = 25$

$+3 \quad +3$

$\frac{4x}{4} = \frac{28}{4}$

$\boxed{x = 7}$

10. Solve the radical equation: $\sqrt{5x-4} - 2 = 2$

$+2 \quad +2$

$\sqrt{5x-4}^2 = 4^2$

$5x - 4 = 16$

$+4 \quad +4$

$\frac{5x}{5} = \frac{20}{5}$

$\boxed{x = 4}$

11. Solve the radical equation: $\sqrt{11-x} = (x+1)^2 (x+1)$

$$11 - x = x^2 + 1x + 1x + 1$$

$$11 - x = x^2 + 2x + 1$$

$$-11 + 1x \qquad\qquad +1x \quad -11$$

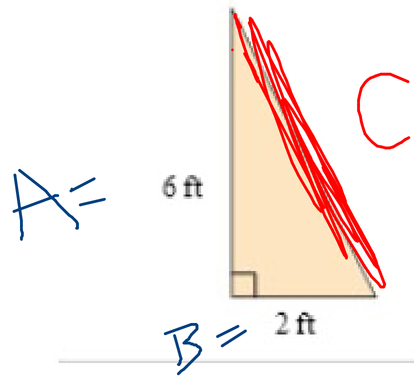
$$x^2 + 3x - 10 \qquad 5 \quad 2$$

$$(x+5)(x-2)$$

$$x = -5 \qquad \boxed{x = 2}$$

12. Find the length of the unknown side of the triangle. State your answer in both simplified radical form as well as decimal form correct to two decimal places.

$A^2+B^2=C^2$



6^2+2^2

$36+4=\sqrt{40}$

$\sqrt{4}\sqrt{10}$

$\boxed{2\sqrt{10}}$

13. Simplify, using i notation as needed: $\sqrt{-54}$

$\sqrt{9}\sqrt{6}$

$i3\sqrt{6}$

14. Add and write answer in a+bi form: $(2-8i)+(9+5i)$

$11-3i$

15. Multiply and write answer in a+bi form: $5i(3-4i)$

$15i-20\boxed{i^2}$ change sign

(-1)

$\boxed{20+15i}$ ✓

16. Multiply and write answer in a+bi form: $2i(5-8i)$

$10i-16\boxed{i^2}$

$\boxed{16+10i}$ ✓

17. Multiply and write answer in a+bi form: $(2-5i)^2$ $(2-5i)$

$4-10i-10i+25i^2$

-25

$\boxed{-21-20i}$ ✓

18. Solve using the quadratic formula: $x^2 + 5 = 6x$

$$\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$-6x \quad -6x$$

$$x^2 - 6x + 5$$

$A = 1 \quad B = -6 \quad C\ 5$

$$\frac{6 \pm \sqrt{(-6)^2 - 4(1)(5)}}{2(1)} = \frac{6 \pm \sqrt{36 - 20}}{2} \qquad = \sqrt{16} = 4$$

$$\frac{6 \pm 4}{2} = 3 \pm 2$$

$3 + 2 = 5$ ✓

$3 - 2 = 1$ ✓

19. Solve using the quadratic formula: $x^2 - 6x + 13 = 0$

$$\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

A 1 B −6 C 13

$$\frac{6 \pm \sqrt{(-6)^2 - 4(1)(13)}}{2(1)}$$

$$\frac{6 \pm \sqrt{36 - 52}}{2} = \sqrt{-16} = 4i$$

$$\frac{6 \pm 4i}{2} = \boxed{3 \pm 2i}$$

20. Solve using the quadratic formula: $2x^2 + 7x - 4 = 0$

A B C

$$\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$\frac{-7 \pm \sqrt{7^2 - 4(2)(-4)}}{2(2)} = \frac{-7 \pm \sqrt{49 + 32}}{4}$$

$\sqrt{81} = 9$

$$\frac{-7 \pm 9}{4}$$

$$\frac{-7+9}{4} = \frac{2}{4} = \frac{1}{2}$$ ✓

$$\frac{-7-9}{4} = \frac{-16}{4} = \boxed{-4}$$ ✓

21. Solve using the quadratic formula: $(x+4)(x+2)=7$

$$\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$x^2 + 2x + 4x + 8 = 7$

$-7 \quad -7$

$1x^2 + 6x + 1$

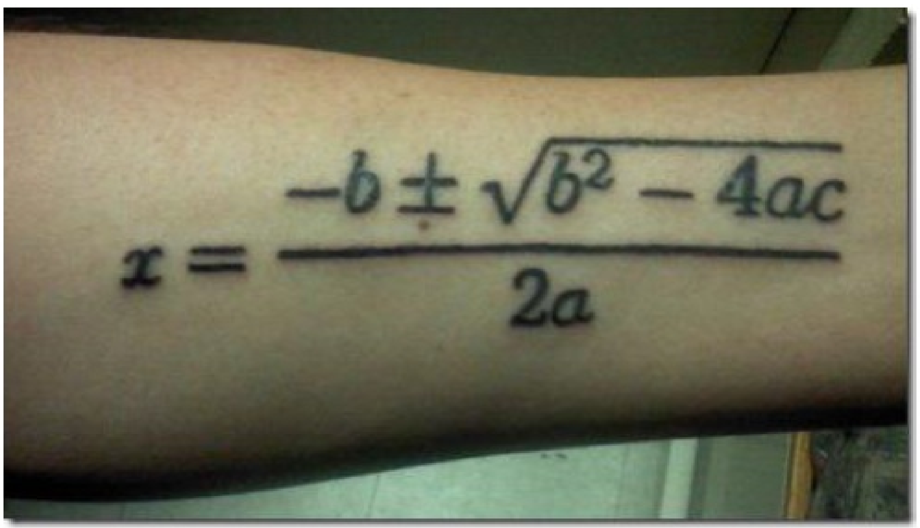
$4\sqrt{2}$

$\sqrt{16}\sqrt{2}$

$$\frac{-6 \pm \sqrt{6^2 - 4(1)(1)}}{2(1)} = \frac{-6 \pm \sqrt{36-4}}{2} \qquad = \sqrt{32}$$

$$\frac{-6 \pm 4\sqrt{2}}{2} = \boxed{-3 \pm 2\sqrt{2}}$$

$$\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$



22. Find the vertex of the graph of this quadratic function: $f(x)=x^2+2x-8$

$$\frac{-b\ \cancel{\pm\sqrt{b^2-4ac}}}{2a}$$

A 1 B 2

$$\frac{-b}{2a}$$

Vertex

$$\frac{-2}{2(1)} = \frac{-2}{2} = \boxed{-1} \checkmark$$

$$(-1)^2+2(-1)-8$$

$$1-2-8=\boxed{-9} \checkmark$$